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Attorney's Docket No.: 07844-353001 / P328

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Martin E. Newell et al.

Serial No. : 09/458,917

Filed : December 10, 1999

Title : MANIPULATION OF CURVES AND SURFACES

Art Unit : 2676
Examiner : W. Sajous
Confirmation No.: 9475
Notice of Allowance Date: 1/12/2005

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT AFTER ALLOWANCE
PURSUANT TO 37 C.F.R. §1.312

Please amend the application as indicated on the following pages. This amendment is being filed concurrently with the payment of the issue fee.

CERTIFICATE OF MAILING BY FIRST CLASS MAIL

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March 29, 2005

Date of Deposit

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Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Previously Presented) A method comprising receiving a user-specified change in position of any arbitrary target location on a Bezier shape, the Bezier shape being governed by control points, and in response to the user-specified change in position, determining new positions for canonical locations of the Bezier shape based on predefined behaviors of the canonical locations with respect to the user-specified change in position, the positions of the canonical locations along or across the Bezier shape being predefined to divide the Bezier shape into sections of predetermined proportions such that a particular one of the canonical locations at least sometimes has two different predefined behaviors, with respect to the user-specified change in position, when the user-specified arbitrary target location is, respectively, in different sections of the shape, and determining the control points for a new Bezier shape based on the new positions of the canonical locations.
2. (Previously Presented) The method of claim 1 in which the Bezier shape comprises a curve or a surface.
3. (Previously Presented) The method of claim 1 wherein the new Bezier shape that is governed by the determined control points has a path or surface that is determined by the path or surface of the Bezier shape that existed prior to receiving the user-specified change in position, and by the user-specified change in position.

4. (Previously Presented) A medium storing machine readable instructions arranged to cause a machine to

receive a user-specified change in position of any arbitrary target location on a Bezier shape, the Bezier shape being governed by control points, and

in response to the user-specified change in position, determine new positions for canonical locations of the shape based on predefined behaviors of the canonical locations with respect to the user-specified change in position, the positions of the canonical locations along or across the Bezier shape being predefined to divide the Bezier shape into sections of predetermined proportions such that a particular one of the canonical locations at least sometimes has two different predefined behaviors, with respect to the user-specified change in position, when the user-specified arbitrary target location is, respectively, in different sections of the shape, and

determining the control points of a new Bezier shape based on the new positions of the canonical locations.

5. (Previously Presented) A method comprising receiving a user-specified change in position of any arbitrary target location on a Bezier shape, the Bezier shape being governed by control points,

in response to the user-specified change in position, determining new positions for canonical locations of the shape based on predefined behaviors of the canonical locations, the positions of the canonical locations along or across the Bezier shape being predefined to divide the Bezier shape into sections of predetermined proportions such that a particular one of the canonical locations at least sometimes has two different predefined behaviors, with respect to the user-specified change in position, when the user-specified arbitrary target location is, respectively, in different sections of the shape, the predefined intended behaviors being expressed in scaled response functions that define the relationship between changes in positions of target locations and changes in positions of canonical locations,

adjusting the control points so that a new Bezier shape contains the canonical locations in their new positions, and

rendering the new Bezier shape based on the new positions of the canonical locations so that the target location in its changed position lies on the rendered Bezier shape.

6. (Previously Presented) A method comprising receiving a user-specified change in position of a target location on a Bezier curve or surface, the target location not being on a boundary of the curve or surface, the Bezier curve or surface being governed by control points, and

in response to the user-specified change in position, determining new positions for canonical locations of the curve or surface based on predefined behaviors of the canonical locations with respect to the user-specified change in position, the positions of the canonical locations along or across the Bezier shape being predefined to divide the Bezier shape into sections of predetermined proportions such that a particular one of the canonical locations at least sometimes has two different predefined behaviors, with respect to the user-specified change in position, when the user-specified arbitrary target location is, respectively, in different sections of the shape, and

determining the control points for a new Bezier shape based on the new positions of the canonical locations.

7. (Previously Presented) A method comprising enabling a user to drag a target location on a Bezier curve or surface to indicate a new position for the target location, the target location not being on a boundary of the Bezier surface, the Bezier curve or surface being governed by control points, and

in response to the dragging, determining new positions for canonical locations of the curve or surface based on predefined behaviors of the canonical locations with respect to the user-specified change in position, the positions of the canonical locations along or across the Bezier shape being predefined to divide the Bezier shape into sections of predetermined

proportions such that a particular one of the canonical locations at least sometimes has two different predefined behaviors, with respect to the user-specified change in position, when the user-specified arbitrary target location is, respectively, in different sections of the shape, and

determining the control points for a new Bezier shape based on the new positions of the canonical locations.

8. (Previously Presented) The method of claim 1, 6, or 7 in which the shape comprises a d-degree Bezier curve, d an integer greater than 1, governed by d+1 control points.

9. (Previously Presented) The method of claim 8 in which there are d+1 canonical locations.

10. (Previously Presented) The method of claim 1, 6, or 7 further comprising adjusting the control points so that the Bezier shape contains the canonical locations in their new positions.

11. (Previously Presented) The method of claim 1, 6, or 7 further comprising rendering the Bezier shape based on the new positions of the d+1 canonical locations.

12. (Currently Amended) The method of ~~claim 10~~ claim 11 in which the target location in its changed position lies on the rendered Bezier shape.

13. (Previously Presented) The method of claim 1, 6, or 7 in which the predefined behaviors are expressed in response functions that define the relationship between changes in positions of target locations and changes in positions of canonical locations.

14. (Previously Presented) The method of claim 9 in which the Bezier shape comprises a curve, the $d+1$ canonical locations define d sections in order along the shape from one end to the other end, and the predefined intended behavior comprises the following:

when the target location is in the first section, the one end is relocated, and the other end is constrained to its original location, and

when the target location is in the d th section, the other end is relocated and the one end is constrained to its original location.

15. (Previously Presented) The method of claim 1, 6, or 7 in which the Bezier shape comprises a d -degree curve, the one end and the other end comprise end points of the curve, and the target location comprises a point along the curve.

16. (Previously Presented) The method of claim 1, 6, or 7 in which the Bezier shape comprises a 3-degree curve and there are four canonical locations.

17. (Previously Presented) The method of claim 1, 6, or 7 in which the Bezier shape comprises a 2-degree curve and there are three canonical locations.

18. (Previously Presented) The method of claim 1, 6, or 7 in which the control points are adjusted using a pre-computed basis coefficient matrix.

19. (Previously Presented) The method of claim 1, 6, or 7 in which the Bezier shape comprises a surface and in which the position of the target location is determined by forming a mesh on the surface and searching quadrilaterals of the mesh.

20. (Previously Presented) The method of claim 16 further comprising processing the relocation information as a series of curve relocations.

21. (Previously Presented) The method of claim 4 wherein the new Bezier shape that is governed by the determined control points has a path or surface that is determined by the path or surface of the Bezier shape that existed prior to receiving the user-specified change in position, and by the user-specified change in position.

22. (Previously Presented) The method of claim 5 wherein the new Bezier shape that is governed by the determined control points has a path or surface that is determined by the path or surface of the Bezier shape that existed prior to receiving the user-specified change in position, and by the user-specified change in position.

23. (Previously Presented) The method of claim 6 wherein the new Bezier shape that is governed by the determined control points has a path or surface that is determined by the path or surface of the Bezier shape that existed prior to receiving the user-specified change in position, and by the user-specified change in position.

24. (Previously Presented) The method of claim 7 wherein the new Bezier shape that is governed by the determined control points has a path or surface that is determined by the path or surface of the Bezier shape that existed prior to receiving the user-specified change in position, and by the user-specified change in position.

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REMARKS

Applicant has amended claim 12 to correct the dependency and renumbered previously pending claim 29 to be claim 24.

Applicant asks that all claims be allowed in view of the amendment to the claims.

Please apply any charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: 2/7/5



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